

## REMARKS

### Missing Information Disclosure Statement

Applicants note that their Information Disclosure Statement mailed on February 28, 2003 and stamped received by the Office on March 5, 2003 was not acknowledged in the office action. Applicants are enclosing herewith a copy of the originally submitted Form 1449, a copy of the OIPE-stamped-received postcard indicating receipt of the Form 1449 and accompanying references, and copies of the two listed references that are not U.S. patents (i.e., a copy of International Patent Application WO 01/25358 A1, and a copy of the International Search Report for International Patent Application No. PCT/US 02/13996). Applicants would appreciate the Examiner's considering the references listed on the Form 1449 and sending Applicants a copy of the initialed and signed Form 1449.

### Claim Cancellations

Claim 29-32, 36, and 37, which had been withdrawn from consideration, have been canceled without prejudice in order to expedite allowance of the application.

### Claim Rejections Under 35 U.S.C. § 112, Second Paragraph

Claim 22 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the office action states that "[f]or claim 22, there is a lack of antecedent basis in the terms 'the thermosetting resin' and 'the compatibilizing agent'. The claim does not set forth what components correspond to the thermosetting resin and what components correspond to the compatibilizing agent." 8/24/04 Office Action, page 2, paragraph 2.

Claim 22 has been amended to effectively substitute "epoxy resin" for "thermosetting resin", and "polyvinyl butyral" for "compatibilizing agent". Support for these amendments may be found in claim 22 as filed, as well as in claims 9 and 13 as filed. Believing that the amendments have cured any lack of antecedent basis, Applicants

respectfully request the reconsideration and withdrawal of the rejection of claim 22 under 35 U.S.C. § 112, second paragraph.

Claim Rejections Under 35 U.S.C. § 103(a)

Claims 1-11, 14-17, 20, 21, 23-28, 33-35, 38, and 39 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Clough (U.S. Patent No. 6,518,362) in view of Mallikarjun (U.S. Patent No. 5,212,239). Applicants respectfully traverse this rejection.

Clough generally describes a curable melt blended composition and a method of making the composition by melt blending a thermoplastic polymer comprising polyphenylene ether (PPE) polymer and a polystyrene polymer, and optionally a compatibilizer, with an uncured epoxy component, comprising a curable epoxy and an epoxy curing agent, at a temperature greater than 150°C and without addition of solvent. Clough abstract.

Mallikarjun generally describes resin blends obtained by blending crystalline propylene polymers, random thermoplastic styrenic copolymers containing  $\alpha,\beta$ -unsaturated dicarboxylic acid anhydride, and amino- or hydroxy-functionalized elastomers. Mallikarjun abstract. The amino- or hydroxy-functionalized elastomers may be formed in situ by the reaction of anhydride-functionalized elastomers and linking compounds having at least two active-hydrogen containing functional groups such as amino or hydroxyl. *Id.*

Applicants' Claim 1 is direct to a curable composition comprising specific amounts of (a) a poly(arylene ether), (b) one or more of several specific thermosetting resins, (c) one or more of specific compatibilizing agents, and (d) one or more of specific amine cure agents. Claim 1 is reproduced below for the convenience of the Examiner.

1. (original) A curable composition, comprising:  
about 5 to about 50 parts by weight of a poly(arylene ether);  
about 25 to 90 parts by weight of a thermosetting resin selected  
from the group consisting of epoxy resins, polyester resins, polyimide  
resins, bis-maleimide resins, cyanate ester resins, vinyl resins,

benzoxazine resins, benzocyclobutene resins, and mixtures comprising at least one of the foregoing thermosetting resins;

about 0.5 to about 15 parts by weight of a compatibilizing agent selected from the group consisting of polyvinyl acetal resins, styrene-butadiene-styrene block copolymers, styrene ethylene styrene block copolymers, styrene-ethylene-butylene-styrene block copolymers, functionalized butadiene-acrylonitrile copolymers, styrene-butadiene core shell rubbers, styrene-butadiene-styrene core shell rubbers, and mixtures comprising at least one of the foregoing compatibilizing agents; and

about 3 to about 150 parts by weight per 100 parts of weight of the thermosetting resin of an amine cure agent selected from the group consisting of amidoamines, polyamides, cycloaliphatic amines, modified cycloaliphatic amines, aromatic amines, modified aromatic amines, BF<sub>3</sub>-amine adducts, imidazoles, guanidines, arylene polyamines, and mixtures comprising at least one of the foregoing amine cure agents;

wherein the parts by weight of the poly(arylene ether), the thermosetting resin, and the compatibilizing agent sum to 100.

Claim 1 is patentable over Clough in view of Mallikarjun for at least three reasons: (1) there is no motivation to combine Clough and Mallikarjun, (2) Clough and Mallikarjun do not suggest or provide an expectation of success for Applicants' claim 1 compositions, and (3) Clough and Mallikarjun do not teach all elements of Applicants' claim 1.

Claim 1 is patentable over Clough in view of Mallikarjun because one of ordinary skill in the art would not have been motivated to combine these references. "When a rejection depends on a combination of prior art references, there must be some teaching, suggestion, or motivation to combine the references." *Ecolchem, Inc. v. Southern California Edison Co.*, 56 U.S.P.Q.2d 1065, 1073 (Fed. Cir. 2000). For one of ordinary skill in the art to be motivated to combine references, the references must be from analogous art areas. *In re Clay*, 966 F.2d 656, 658-659 (Fed. Cir. 1992). A secondary reference is analogous art with respect to a primary reference if the secondary reference is (1) from the same field of endeavor, regardless of the problem addressed, or (2) not from the same field of endeavor, but reasonably pertinent to the particular problem with which the inventor is involved. *Id.* at 658-659. Clough and Mallikarjun are not from the same field of endeavor. Clough relates to curable compositions prepared by melt blending a polyphenylene ether, a polystyrene polymer, an epoxy resin, and an epoxy curing agent, optionally in combination with a compatibilizer. Clough abstract. In contrast,

Mallikarjun relates to thermoplastic blends of crystalline propylene polymers and styrenic polymers. Mallikarjun abstract. Mallikarjun does not teach the use of polyphenylene ethers or epoxy resins. The only mention of epoxy groups in Mallikarjun is in the context of preparing hydroxy-functionalized elastomeric polymers by partially epoxidizing an unsaturated elastomers, then hydrolyzing the epoxy groups. Mallikarjun, col. 14, lines 48-51. The Clough and Mallikarjun compositions are thus very distinct in both chemical composition and use, and they are therefore from different fields of endeavor. Furthermore, Mallikarjun is not “reasonably pertinent to the particular problem with which the inventor is involved.” Applicants’ invention addresses the difficulty of preparing thermosetting compositions comprising substantial amounts of higher molecular weight poly(arylene ether) resins. Instant Application, paragraph 1. In contrast, Mallikarjun is directed to improving the physical properties of (thermoplastic) polypropylene-based resins. Mallikarjun, col. 1, ll. 31-34. Mallikarjun is therefore not reasonably pertinent to the particular problem with which Applicants are involved. Since Mallikarjun is not from the same field of endeavor as Clough and not pertinent to the problem addressed by Applicants’ invention, Mallikarjun and Clough are not analogous art, and there is no motivation for one of ordinary skill in the art to combine them. Their combination therefore cannot support a prima facie case of obviousness against Applicants’ claim 1.

Even if Clough and Mallikarjun were from analogous art areas, they would not render Applicants’ Claim 1 unpatentable because they collectively fail to suggest Applicants’ claim 1 composition or provide an expectation for its success. “Combining prior art references without evidence of such a suggestion, teaching, or motivation simply takes the inventor’s disclosure as a blueprint for piecing together the prior art to defeat patentability – the essence of hindsight.” *In re Dembiczak*, 50 U.S.P.Q.2d 1614, 1617 (Fed. Cir. 1999). “Both the suggestion and the expectation of success must be founded in the prior art, not in applicant’s disclosure.” *In re Dow Chemical*, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988). Clough describes many functionalized polystyrenes suitable for use as compatibilizers. Clough, col. 4, ll. 31-65. First among the specific compatibilizer taught by Clough are “styrene-maleic anhydride (SMA) copolymers”. Clough, col. 4, ll. 49-50. SMA copolymers are also the only compatibilizers used in the working examples.

Clough, col. 13, lines 34-56. Clough thus expresses a preference for SMA copolymers as compatibilizers. To the extent that Clough mentions, as an alternative compatibilizer, “functionalized block copolymers . . . including, for example, maleated Kraton<sup>TM</sup> polymers”, specific functionalized block copolymers are not taught. If one of ordinary skill in the art were looking to another patent to provide an example of such a copolymer, one would look for a patent that taught specific functionalized block copolymers as components of a composition that consisted primarily of polyphenylene ether resins and epoxy resins. Absent such a reference, one would at least look for a reference that taught specific functionalized block copolymers as components of a composition that contained substantial amounts of polyphenylene ether resins or epoxy resins. Mallikarjun’s compositions contain neither polyphenylene ether resins nor epoxy resins. One of ordinary skill in the art would therefore have no motivation to turn to Mallikarjun to cherry-pick the maleated styrene-ethylene-butylene-styrene copolymers from that reference for incorporation them into the compositions of Clough. Absent impermissible hindsight knowledge of Applicants’ invention, Applicants can imagine no suggestion or motivation to select the maleated styrene-ethylene-butylene-styrene copolymers of Mallikarjun for use in the curable compositions of Clough. And even if that selection and incorporation was suggested, the references provide no expectation of Applicants’ unexpected discovery that the use of their particular compatibilizing agents “allows the poly(arylene ether) to remain finely dispersed in the thermosetting resin at temperatures suitable for the use of amine cure agents.” Instant application, paragraph no. 11. In sum, Clough and Mallikarjun do not render Applicants’ claim 1 obvious because Clough and Mallikarjun, each viewed as a whole, fail to suggest Applicants’ claim 1 composition or provide an expectation for its success.

Finally, Claim 1 is patentable over Clough in view of Mallikarjun because neither Clough nor Mallikarjun teaches any of Applicants’ claim 1 compatibilizing agents. For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a *prima facie* case of obviousness. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). Establishing a *prima facie* case of obviousness requires that all elements of the invention be disclosed in the prior art. *In re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A 1970). The office action points to Clough’s teaching of maleated Kraton polymers (Clough, col. 4,

line 64), and Mallikarjun's teaching of maleated styrene-ethylene/1-butene-styrene rubbers sold as KRATON FG1901X (Mallikarjun, col. 10, lines 7-12). The office action also incorrectly characterizes Applicants' claim 1 "styrene-ethylene-butylene-styrene block copolymers" as "not includ[ing] functional styrene-ethylene-butylene-styrene block copolymers." 8/24/04 Office Action, page 4, paragraph 6.

Applicants assert, first, that one of ordinary skill in the art would understand the term "styrene-ethylene-butylene-styrene block copolymers" to be limited to triblock copolymers consisting of two polystyrene segments bridged by a poly(ethylene-butylene) segment. The term thus excludes functionalized polymers obtained by reacting "styrene-ethylene-butylene-styrene block copolymers" with functionalizing agents such as maleic anhydride. This interpretation is reinforced by the clause in which the term occurs. Note, in particular, that the recited compatibilized agents further include "functionalized butadiene-acrylonitrile copolymers". (Emphasis added.) If functionalized polymers were implicit in each of the recited compatibilizing agents, there would have been no reason to specifically recite "functionalized butadiene-acrylonitrile copolymers" – recitation of "butadiene-acrylonitrile copolymers" would have been sufficient. Applicants thus respectfully assert that their claim 1 "styrene-ethylene-butylene-styrene block copolymers" are limited to unfunctionalized "styrene-ethylene-butylene-styrene block copolymers", and that such unfunctionalized "styrene-ethylene-butylene-styrene block copolymers" are not taught by Clough or Mallikarjun.

Applicants respectfully assert, second, that even if one of ordinary skill in the art understood the term "styrene-ethylene-butylene-styrene block copolymers" to include functionalized versions of such triblock copolymers, that meaning is not controlling. Applicants are entitled to be their own lexicographers. *Hoechst Celanese Corp. v. BP Chems. Ltd.*, 78 F.3d 1575, 1578, 38 USPQ2d 1126, 1129 (Fed.Cir.1996) ("A technical term used in a patent document is interpreted as having the meaning that it would be given by persons experienced in the field of the invention, unless it is apparent from the patent and the prosecution history that the inventor used the term with a different meaning."); *Hormone*, 904 F.2d at 1563, 15 USPQ2d at 1043 ("It is a well-established axiom in patent law that a patentee is free to be his or her own lexicographer and thus

may use terms in a manner contrary to or inconsistent with one or more of their ordinary meanings."). Here, Applicants' contrasting use of "styrene-ethylene-butylene-styrene block copolymers" and "functionalized butadiene-acrylonitrile copolymers" within the same clause of claim 1 makes it clear that the "styrene-ethylene-butylene-styrene block copolymers" do not include functionalized copolymers. The maleated Kraton polymers of Clough and the maleated styrene-ethylene/1-butene-styrene rubbers of Mallikarjun therefore are chemically distinct from Applicants' claim 1 "styrene-ethylene-butylene-styrene block copolymers". Clough and Mallikarjun also fail to teach any of the other compatibilizing agents recited in Applicants' claim 1.

Accordingly, and because claims 2-11, 14-17, 20, 21, 23-28, 33-35, 38, and 39 each include or further limit each of the limitations of claim 1, Applicants respectfully request the reconsideration and withdrawal of the rejection of claims 1-11, 14-17, 20, 21, 23-28, 33-35, 38, and 39 under 35 U.S.C. § 103(a) over Clough in view of Mallikarjun.

#### Claim Objections

Claims 12, 13, 18 and 19 stand objected to as being dependent upon a rejected base claim, but allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. 8/24/04 Office Action, page 4, paragraph 6. Applicants have accordingly rewritten claims 12, 13, 18 and 19 in independent form including all of the limitations of the base claim and any intervening claims.

Claim 22 has been characterized as "allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action." As described above, Claim 22 has been amended to overcome the rejection under 35 U.S.C. § 112, second paragraph.

Applicants thus respectfully request the reconsideration and allowance of claims 12, 13, 18, 19 and 22.

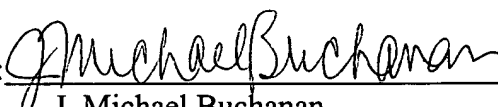
60LT01103  
(GP3-0009)

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance is requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 07-0862 maintained by Assignee.

Respectfully submitted,

CANTOR COLBURN LLP  
Applicants' Attorneys

By:   
J. Michael Buchanan  
Registration No. 44,571

Date: September 17, 2004  
Customer No.: 23413  
Telephone: (860) 286-2929